

In the Claims

1. (currently amended) A multiple-input multiple-output (MIMO) wireless communications system comprising:

(i) an a dual polarised antenna array comprising a plurality of transmit antenna elements;

(ii) a beamformer for coherently combining elements of a same polarisation to and forming a first plurality of directional antenna beam[[s]] having a first polarisation and a second directional beam having a second polarisation;  
and

(iii) ~~(ii)~~ a plurality of receive antenna elements;

wherein the first and second beams provide two independent MIMO channels plurality of antenna beams provide polarisation diversity and wherein the transmit antenna elements are arranged such that spatial diversity is avoided.

2. (original) A MIMO wireless communications system as claimed in claim 1 wherein each of said transmit antenna elements is polarised at one of two first substantially orthogonal polarisations.

3. (original) A MIMO wireless communications system as claimed in claim 2 wherein each of said receive antenna elements is polarised at one of two second substantially orthogonal polarisations.

4. (original) A MIMO wireless communications system as claimed in claim 3 wherein said two first substantially orthogonal polarisations are different from said two second substantially orthogonal polarisations.

5. (original) A MIMO wireless communications system as claimed in claim 1 wherein said plurality of transmit antenna elements comprises one or more dual-polar-elements each such dual-polar-element being two co-located antenna elements operable from a single antenna aperture.

6. (Cancelled)

7. (original) A MIMO wireless communications system as claimed in claim 1 which is arranged to operate at a particular wavelength and wherein the inter-

element spacing of the transmit antenna elements is less than one of the particular wavelength.

8. (currently amended) A MIMO wireless communications system as claimed in claim 1 which is arranged to provide both non-MIMO communications and in addition to MIMO communications substantially simultaneously.

9. (Cancelled)

10. (currently amended) A MIMO wireless communications system as claimed in claim ~~[[9]]~~ 1, ~~comprising wherein said plurality of antenna beams are provided using one or more beamformers integral with the transmit antenna elements.~~

11. (currently amended) A MIMO wireless communications system as claimed in claim ~~[[9]]~~ 1 wherein said beamformer forms a plurality of antenna beams comprising pairs of antenna beams, each pair comprising a first antenna beam of a first polarisation and a second antenna beam, substantially identical to the first but provided at a second polarisation different from the first polarisation.

12. (original) A MIMO wireless communications system as claimed in claim 11 wherein each of said pairs of antenna beams is arranged to provide a two-branch MIMO input.

13. (original) A MIMO wireless communications system as claimed in claim 1 which is selected from a 2:2 and a 2:4 MIMO system.

14. (original) A MIMO wireless communications system as claimed in claim 1 which is selected from a fixed wireless access system, a personal area network, a wireless local area network, and a mobile communications network.

15. (original) A MIMO wireless communications system as claimed in claim 1 wherein each of said transmit antenna elements comprises a column of antenna elements.

16. (currently amended) A multiple-input multiple-output wireless communications method comprising the steps of:-

(i) forming a first ~~plurality of antenna directional beam[s]~~ having a first polarisation and a second directional beam having a second polarisation from a transmit dual polarised antenna array comprising a plurality of antenna elements by coherently combining elements of a same arranged such that polarisation diversity is provided and spatial diversity is avoided;

(ii) transmitting a space-time coded signal from said transmit antenna array, wherein said first and second beams provide two independent MIMO channels; and

(iii) receiving the space-time coded signal at a receive antenna arrangement comprising a plurality of receive antenna elements.

17. (previously presented) A method as claimed in claim 16 which further comprises:

(i) positioning the transmit antenna array and the receive antenna arrangement such that a line of sight path is present between those two arrangements; and

(ii) using said transmit antenna array to transmit the space-time coded signal to the receive antenna arrangement at least partly along said line of sight path.

18. (previously presented) A method as claimed in claim 16 which further comprises transmitting a non-space-time coded signal from the transmit antenna array simultaneously with the space-time coded signal.

19. (currently amended) An antenna arrangement for use in a multiple-input multiple-output (MIMO) wireless communications system; said antenna arrangement comprising

a[[n]] dual polarised antenna array comprising a plurality of transmit antenna elements and

a beamformer for coherently combining elements of a same polarisation to form[[ing]] a plurality of antenna first directional beam[s] having a first polarisation and a second directional beam having a second polarisation,  
wherein the first and second plurality of beams provide polarisation diversity and

~~wherein the transmit antenna elements are such that spatial diversity is avoided~~  
two independent MIMO channels.

20. (previously presented) An antenna arrangement as claimed in claim 19 which is arranged to operate at a particular wavelength and wherein the transmit antenna elements have an inter-element spacing which is less than one of the particular wavelength.

21. (original) An antenna arrangement as claimed in claim 19 which is also suitable for use in a non-MIMO communications system simultaneously with use in the MIMO communications system.

22. (original) A method of operating an antenna arrangement as claimed in claim 19 which comprises transmitting space-time coded signals from said antenna arrangement.

23. (original) A method of operating an antenna arrangement as claimed in claim 19 which further comprises a plurality of receive antenna elements and wherein said method comprises receiving space-time coded signals at said antenna arrangement, said signals being polarisation diverse and having a substantially insignificant amount of spatial diversity.